REMARKS

Claims 1 through 6, 8 through 14, and 20 have been amended. Claims 1 through 20 remain in the application.

The drawings were objected to as failing to comply with 37 C.F.R. 1.84(p)(4) because reference character "33" has been used in Figure 2 to designate both hub/inner diameter and another element. Applicant respectfully traverses this objection.

Attached is a copy of the drawing for Figure 2 with corrections in red to remove the reference numeral "33" as suggested by the Examiner for the Examiner' approval. Also attached is an amended replacement drawing sheet for Figure 2 as corrected. It is respectfully submitted that the drawings overcome the objection.

The disclosure was objected to because of an informality in paragraph 00026. Applicant respectfully traverses this objection.

The specification has been amended on page 10, paragraph 00026, to delete "4" and insert therefore "6" to correct the formality. It is respectfully submitted that the specification is allowable over the objection.

Claims 4 and 12 were objected to under 37 C.F.R. 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant respectfully traverses this objection.

Claims 4 and 12 have been amended to clarify that the claimed range excludes zero degrees. It is respectfully submitted that claims 4 and 12 are allowable over the objection.

Claims 3 through 5, 9, and 11 through 14 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which Applicant regards as the invention. Applicant respectfully traverses this rejection.

Claims 3 through 5 have been amended to depend from claim 2 to provide proper antecedent basis. Claim 9 has been amended to clarify the blades by amending "a plurality of" to "said". Claims 11 through 13 have been amended to depend from claim 10 to provide proper antecedent basis. Claim 8 has been amended to add the term "trailing edge" to clarify claim 14. It is respectfully submitted that claims 3 through 5, 9, and 11 through 14 are allowable over the rejection under 35 U.S.C. § 112, second paragraph.

Claims 1, 2 through 4, 6, and 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Brady (U.S. Patent No. 2,283,844). Applicants respectfully traverse this rejection.

U.S. Patent No. 2,283,844 to Brady discloses a pump. A pump casing is provided with bearings 13 and 14 which rotatably carry a rotor shaft 15. Fixed on the shaft 15 is the rotor or impeller 16, which is provided on opposite sides with annular lands 17 having a running fit with lands 18 on the housing. The rotor has an annular series of impeller blades 27. The blades 27 incline out at a suitable angle to the radial direction, thus projecting rearwardly with respect to the direction of rotation which is clockwise as viewed in Fig. 2. The blades 27 incline forwardly at a substantial angle to their lateral edges 29. In Figs. 3 and 4, the rotor 32 has blades 33 that are connected at their peripheral portions by a shroud ring 34. Brady does <u>not</u> disclose each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation.

In contradistinction, claim 1, as amended, clarifies the invention claimed as an impeller for a fuel pump including a hub portion adapted for attachment to a rotatable shaft and a

plurality of blades extending outwardly from the hub portion and disposed circumferentially thereabout. The impeller also includes a peripheral ring portion extending outwardly from the blades to shroud the blades. The blades are non-radial relative to a center axis of the hub portion. Each of the blades have a point of rotation at a hub diameter through which a radial axis extends and each of the blades have a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation.

A rejection grounded on anticipation under 35 U.S.C. § 102 is proper only where the subject matter claimed is identically disclosed or described in a reference. In other words, anticipation requires the presence of a single prior art reference which discloses each and every element of the claimed invention arranged as in the claim. In re Arkley, 455 F.2d 586, 172 U.S.P.Q. 524 (C.C.P.A. 1972); Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 U.S.P.Q. 481 (Fed. Cir. 1984).

Brady, Jr. '844 does not disclose or anticipate the claimed invention of claims 1, 8, and 20. Specifically, Brady, Jr. '844 merely discloses a pump having an impeller with an annular series of impeller blades that incline out at a suitable angle to the radial direction and project rearwardly with respect to the direction of rotation that are connected at their peripheral portions by a shroud ring. Brady, Jr. '844 lacks each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation. In Brady, Jr. '844, the blades 27 incline out at a suitable angle to the radial direction, but do not have a point of rotation at a hub diameter through which a radial axis extends and have a trailing edge being slanted by a predetermined angle by a line projected from

the trailing edge through the point of rotation. Brady, Jr. '844 fails to disclose the combination of an impeller for a fuel pump including a hub portion adapted for attachment to a rotatable shaft, a plurality of blades extending outwardly from the hub portion and disposed circumferentially thereabout, a peripheral ring portion extending outwardly from the blades to shroud the blades with the blades being non-radial relative to a center axis of the hub portion and each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation as claimed by Applicants. Therefore, it is respectfully submitted that claim 1 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. § 102(b).

Claim 5 was rejected under 35 U.S.C. § 103 as being unpatentable over Brady, Jr. '844 in view of Kato et al. (U.S. Patent No. 5,642,981). Applicant respectfully traverses this rejection for the same reasons given above to claim 1.

Claims 8 through 12 and 14 through 20 were rejected under 35 U.S.C. § 103 as being unpatentable over Brady, Jr. '844 in view of Hufnagel et al. (U.S. Patent No. 5,415,521). Applicant respectfully traverses this rejection.

U.S. Patent No. 5,415,521 to Hufnagel et al. discloses an aggregate for feeding fuel from a supply tank to an internal combustion engine of motor vehicle. The fuel feed aggregate is provided with an electric drive motor 20 with an armature shaft 22 connected with a feed member of a feed pump 24. The feed pump 24 is formed as a flow pump and has the feed member formed as an impeller 26. The impeller 26 rotates in a pump chamber 28. The pump chamber 28 is limited in an axial direction by end walls of housing parts 30 and 32, which similarly to the electric drive motor 20, are also arranged in an aggregate housing 34. In the

radial direction, the pump chamber 28 is directly limited by a ring wall 29. Hufnagel et al. does not disclose each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation.

In contradistinction, claim 8, as amended, clarifies the invention claimed as a fuel pump including a pump section having a flow channel and a rotatable impeller cooperating with the flow channel to pump fuel therethrough. The fuel pump also includes a motor section disposed adjacent the pump section and having a motor to rotate the impeller and an outlet section disposed adjacent the motor section to allow pumped fuel to exit the fuel pump. The impeller includes a plurality of blades that are non-radial relative to a center axis thereof. Each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation. Claim 20 has been amended similar to claim 8 and includes other features of the present invention.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that "[a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have

suggested the claimed subject matter to a person of ordinary skill in the art." In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) ("In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.")

None of the references cited, either alone or in combination, teaches or suggests the claimed invention of claims 8 through 12 and 14 through 20. Specifically, Brady, Jr. '844 merely discloses a pump having an impeller with an annular series of impeller blades that incline out at a suitable angle to the radial direction and project rearwardly with respect to the direction of rotation that are connected at their peripheral portions by a shroud ring. Brady, Jr. '844 lacks each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation. In Brady, Jr. '844, the blades 27 incline out at a suitable angle to the radial direction, but do not have a point of rotation at a hub diameter through which a radial axis extends and have a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation.

Hufnagel et al. '521 merely discloses an aggregate for feeding fuel from a supply tank to an internal combustion engine of motor vehicle having an electric drive motor with an armature shaft connected with a feed member of a feed pump. Hufnagel et al. '521 lacks each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation. In Hufnagel et al. '521, the

impeller 28 has radial blades or vanes 44 and there are no blades or vanes that are non-radial relative to a center axis thereof. As such, there is no suggestion or motivation in the art for combining Brady, Jr. '844 and Hufnagel et al. '521 together.

Even if these references could be combined, neither teaches a fuel pump having an impeller with blades in which each of the blades have a point of rotation at a hub diameter through which a radial axis extends and each of the blades have a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation. Applicants are not attacking the references individually, but are clearly pointing out that each reference is deficient and, if combined (although Applicants maintain that they are not combinable), the combination is deficient. The present invention sets forth a unique and non-obvious combination of a fuel pump including an impeller having a plurality of blades that are slanted or non-radial to improve the efficiency of the fuel pump. The references, if combinable, fail to teach or suggest the combination of a fuel pump including a pump section having a flow channel and a rotatable impeller cooperating with the flow channel to pump fuel therethrough, a motor section disposed adjacent the pump section and having a motor to rotate the impeller, and an outlet section disposed adjacent the motor section to allow pumped fuel to exit the fuel pump, the impeller including a plurality of blades that are non-radial relative to a center axis thereof with each of the blades having a point of rotation at a hub diameter through which a radial axis extends and each of the blades having a trailing edge being slanted by a predetermined angle by a line projected from the trailing edge through the point of rotation as claimed by Applicants.

Further, the CAFC has held that "[t]he mere fact that prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification". In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127

(Fed. Cir. 1984). The Examiner has failed to show how the prior art suggested the desirability of modification to achieve Applicants' invention. Thus, the Examiner has failed to establish a case of prima facie obviousness. Therefore, it is respectfully submitted that claims 8 through 12 and 14 through 20 are allowable over the rejection under 35 U.S.C. § 103.

Claim 13 was rejected under 35 U.S.C. § 103 as being unpatentable over Brady '844 in view of Hufnagel et al. '521 and further in view of Kato et al. '981. Applicant respectfully traverses this rejection for the same reasons given above to claim 8.

Obviousness under § 103 is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. Since the Examiner has not provided a sufficient factual basis, which is supportive of his/her position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967), cert. denied, 389 U.S. 1057 (1968)), the rejections of claims 5 and 8 through 20 are improper. Therefore, it is respectfully submitted that claims 5 and 8 through 20 are allowable over the rejections under 35 U.S.C. § 103.

Based on the above, it is respectfully submitted that the claims are in a condition for allowance, which allowance is solicited.

Respectfully submitted,

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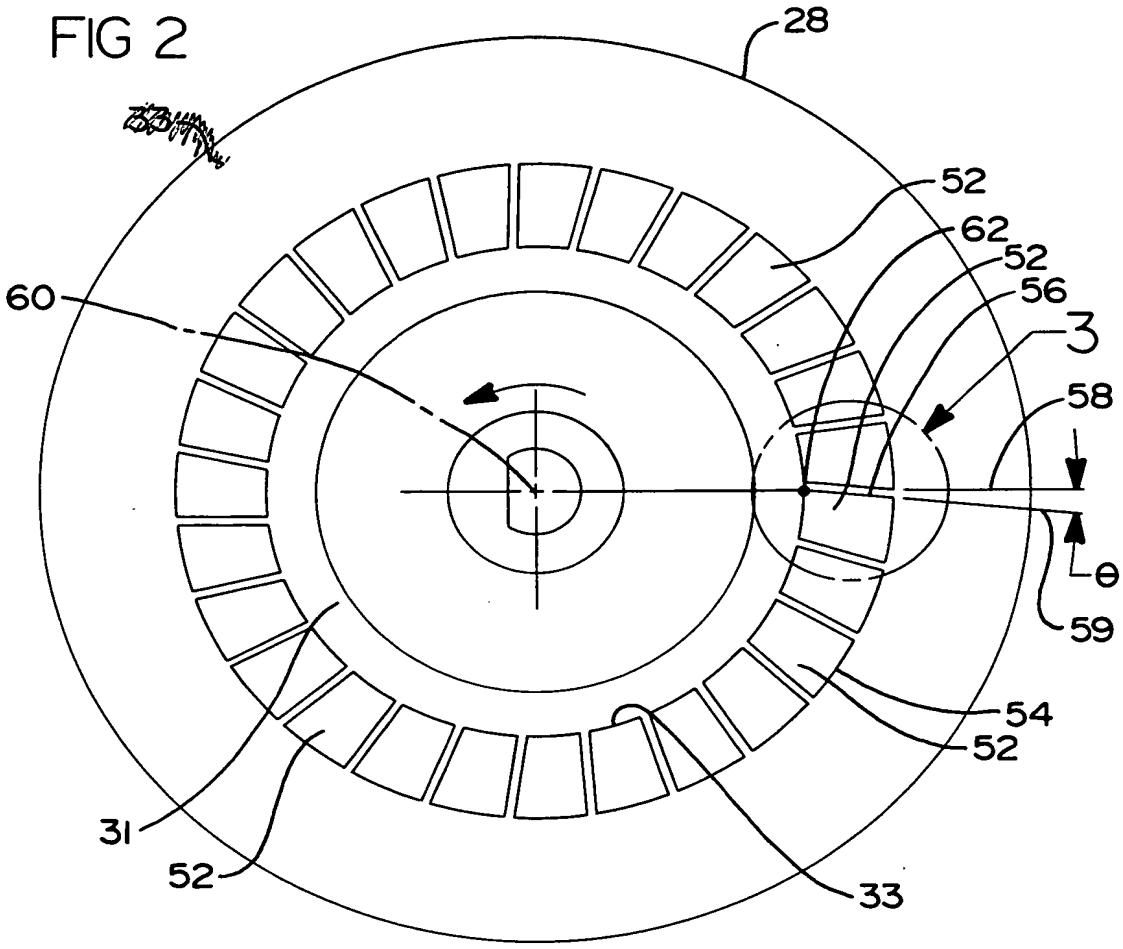
FIG 2



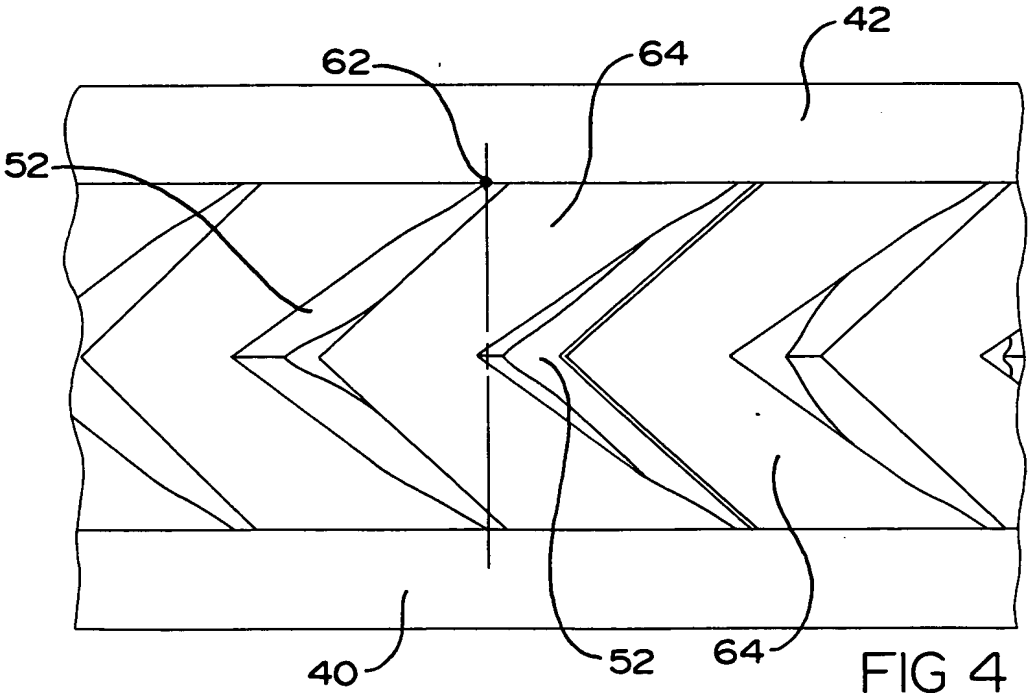


FIG 4